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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Lujun Chen

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EXAMINER

MILLER, BRIAN E

ART UNIT

PAPER NUMBER

2652

DATE MAILED: 06/03/2004

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/843,370

Applicant(s)

CHEN ET AL.

Examiner

Brian E. Miller

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-9 and 11-24 is/are pending in the application.
- 4a) Of the above claim(s) 1,2,4-8,18 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9,11-17,19 and 21-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1,2,4-9 and 11-24 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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Claims 1-2, 4-9, 11-24 are now pending, with claim 18 withdrawn from a previously set forth restriction requirement.

Oath/Declaration

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

It does not identify the foreign application for patent or inventor's certificate on which priority is claimed pursuant to 37 CFR 1.55, and any foreign application having a filing date before that of the application on which priority is claimed, by specifying the application number, country, day, month and year of its filing.

Election/Restrictions

2. Applicant's election of specie (I) in Paper No. 13 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Traversing that "the restriction is improper due to the existence of generic claims," is not considered a proper traversal, i.e., specifically pointing out the supposed errors in the restriction requirement, since the presence (or not) of generic claims, is not a basis for traversal.
3. Claims 1-2, 4-8, 20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected specie, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 12.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 9, 11-12, 15-17, 19, 21-24 rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al (US 5,549,978) in view of Mao et al (US 6,169,647).

(As per claim 11 & 19) Iwasaki et al discloses a magnetoresistive effect element, as shown at least in FIG. 62, including: a first ferromagnetic free layer 85 having a magnetization (M) in a first direction that is aligned in the longitudinal direction when in a quiescent state; a second ferromagnetic free layer 83 having a magnetization (M) that is anti-parallel to the first direction when in the quiescent state (see also col. 51, lines 8-11); a spacer layer 84 between the first and second ferromagnetic free layers; a biasing component including a first anti-ferromagnetic layer 82 exchange coupled to the first ferromagnetic free layer and a second anti-ferromagnetic layer 82 exchange coupled to the second ferromagnetic free layer; wherein M and M rotate about their quiescent bias states in response to an applied magnetic field thereby producing a GMR effect in the sensor as a function of rotation of M and M, which is the principle premise for spin valve

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sensors. It is noted that the method steps of claims 9 & 17 are encompassed by the product as described, supra.

(As per claim 9 & 11) Iwasaki et al is silent as to having the first and second anti-ferromagnetic layers produce a bias magnetization to bias M and M in a third direction to thereby establish quiescent bias states for M and M . Mao et al, in FIG. 3, discloses an MR sensor 80 with two ferromagnetic layers 84, 88, spacer 86 and respective anti-ferromagnetic layers 82, 90. Layer 82 weakly biases sense layer 84 and layer 90 weakly biases layer 88, such that M_{F1} and M_{F2} are each biased into a quiescent bias state 45 degrees out of plane to therefore make a 90 degree angle with each other (see col. 4, lines 26-27, 33-34). Subsequently, in the presence of an applied magnetic field, both M_{F1} and M_{F2} of sense layers 84 and 88 rotate about their quiescent bias point to enhance the sensitivity of the sensor 80 (see col. 4, lines 34-37). Further, Mao et al suggests that the present invention would be easily implemented using current spin valve designs (see col. 4, lines 38-44). From this teaching, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have implemented a bias magnetization field to M and M to establish a quiescent bias state, different than the quiescent state into the MR sensor of Iwasaki et al, as taught by Mao et al. The motivation would have been: providing a quiescent bias state would have increased sensitivity of the MR sensor, which in turn is advantageous in producing high density recording (see col. 4, lines 38-44). (As per claim 15) wherein as shown by Mao et al, the magnetizations M_{F1} and M_{F2} are orientated in a direction that is about 45 degrees to the sense current in their quiescent bias states.

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7. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al in view of Mao et al as applied to claim 11 above, and further in view of Ravipati et al (US 5,739,990). For a description of Iwasaki et al in view of Mao et al, see the rejection, supra.

With respect to claim 13, Iwasaki et al in view of Mao et al remain silent as to first and second contacts positioned in contact with first and second ends of the first and second ferromagnetic free layers and the spacer layer, e.g., both Iwasaki et al in view of Mao et al show the contacts generally on top of the stack. With respect to claim 14, Iwasaki et al in view of Mao et al also remain silent as to the top and bottom shields appropriately placed in the stack.

Ravipati et al, however, discloses an MR sensor, as shown in FIGs. 6, 6A, including electrical lead layers 86, 88 which are positioned in abutting contact with the first and second ferromagnetic layers 80, 82 (see also col. 5, lines 35-40). Further, top and bottom shields 54, 56 are appropriately positioned on the stack, as is known in the art. From these teachings, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the MR sense contacts of Iwasaki et al in view of Mao et al, with the abutting junction type as taught by Ravipati et al, and have utilized top and bottom shields as well. The motivation would have been: having the sense contacts in direct abutting junction with the ferromagnetic layers would have improved current flow, i.e., reduce resistance, and junction interfaces would be reduced, therefore, conductivity and reliability would be improved (see col. 7, lines 22-36). Having the top and bottom shields are conventional in MR heads, to reduce magnetic interference, which would have been readily apparent to a skilled artisan.

Response to Amendment

8. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

A...With respect to claim 18, as set forth in a previous restriction requirement, the limitations in claim 18 are directed to specific method step(s) not required by the product and thus remains withdrawn from further consideration.

Conclusion

9. Applicant's amendment and subsequent election, necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian E. Miller whose telephone number is (703) 308-2850. The examiner can normally be reached on M-TH 7:15am-4:45pm (and every other friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Brian E. Miller
Primary Examiner
Art Unit 2652

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June 1, 2004